

## Refine Search

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L13





### Search History

DATE: Sunday, May 13, 2007

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DB=USPT; PLUR=YES; OP=OR

<u>L13</u>	l2 and l10	4	<u>L13</u>
<u>L12</u>	L3 and l10	5	<u>L12</u>
<u>L11</u>	L10 and l1	0	<u>L11</u>
<u>L10</u>	L9 same l8	80	<u>L10</u>
<u>L9</u>	non-real-time adj1 data	200	<u>L9</u>
<u>L8</u>	real-time adj1 data	4472	<u>L8</u>
<u>L7</u>	L6 and l1	2	<u>L7</u>
<u>L6</u>	error adj1 byte	480	<u>L6</u>
<u>L5</u>	L4 and l1	2	<u>L5</u>
<u>L4</u>	pid adj1 error	57	<u>L4</u>
<u>L3</u>	recording adj1 medium	83386	<u>L3</u>
<u>L2</u>	defect adj1 management	820	<u>L2</u>
<u>L1</u>	6754860[pn] or 6564345[pn]	2	<u>L1</u>

END OF SEARCH HISTORY



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(12) **United States Patent**  
**Ueda et al.**

(10) **Patent No.:** **US 7,027,373 B2**  
(45) **Date of Patent:** **\*Apr. 11, 2006**

(54) **INFORMATION RECORDING MEDIUM,  
INFORMATION RECORDING METHOD AND  
INFORMATION REPRODUCTION METHOD**

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 73 days.

This patent is subject to a terminal disclaimer.

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(30) **Foreign Application Priority Data**  
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(51) Int. Cl.  
**G11B 7/00** (2006.01)

(52) U.S. Cl. .... **369/53.15; 369/53.17**

(58) Field of Classification Search ..... **369/275.3, 369/53.1, 53.12, 53.15, 53.17, 53.21**

See application file for complete search history.

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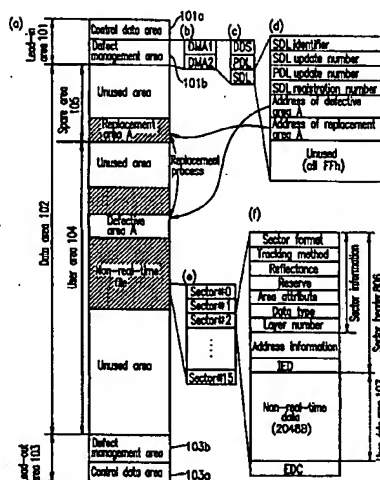
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(57) **ABSTRACT**

An information recording medium comprises a user area, and a spare area including a replacement area, wherein the replacement area may be used instead of a defective area in the user area. The user area and the spare area include a plurality of sectors. Each of the plurality of sectors includes a user data area for recording user data, and an attribute data area for recording defect replacement allowance attribute data. The defect replacement allowance attribute data indicates whether recording of the user data has been executed in a state that the execution of a defect replacement process is allowed. In the defect replacement process, the defective area in the user area is replaced with the replacement area in the spare area.

**1 Claim, 14 Drawing Sheets**



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File: USPT

Feb 10, 2004

DOCUMENT-IDENTIFIER: US 6691265 B2

TITLE: Method for creating defect management information in an recording medium, and apparatus and medium based on said methodAbstract Text (1):

This invention provides a method for creating/writing defect management information of an information recording medium and an apparatus and optical disc based on the method. In the present invention, it depends on the type of data to be reproduced whether or not defective sectors which are detected during reproduction operation are replaced with non-defective sectors. If read-out errors are detected in reproducing non-audio/video data, linear replacement algorithm is applied to the corresponding defective sectors. On the other hand, in case of audio/video data, location information of the corresponding defective sectors is just kept without any sector replacement. Therefore, this invention enables to reproduce audio/video data in real-time regardless of the presence of defective sectors and to avoid writing data to the defective sectors when new data is overwritten to the information recording medium.

Brief Summary Text (3):

The present invention relates to a method for managing defects which arise in an information recording medium, more particularly, to a method for creating/writing defect management information for an information recording medium, and to an apparatus and an optical disc using the method.

Brief Summary Text (6):

For rewritable optical discs such as DVD-RAM, defects which arise in their recording surface should be managed to achieve high reliable write/reproduction operation in a manner that data is not written to sectors in which read-out errors are detected beyond a predetermined level (hereinafter referred to as "defective" or "bad" sectors). To accomplish this, defect management is performed such that addresses of defective sectors are stored in a defect management table on the optical disc and data access to the defective sectors, write or read-out, is prohibited.

Brief Summary Text (9):

Defect management information, or physical addresses of defective sectors within the data area are stored in DMA (defective management area), which is provided in four places, two in lead-in area and the other two in lead-out area, as shown in FIG. 1, to protect against the defects which may arise in the four DMA themselves.

Brief Summary Text (12):

Methods for creating and managing defect management information such as PDL and SDL are explained below with reference to DVD-RAM.

Brief Summary Text (28):

It is therefore a primary object of the present invention to provide a method for creating defect management information which enables to reproduce audio/video data on an information recording medium in real-time regardless of the presence of defective sectors and to avoid writing data to the defective sectors when new audio/video data is recorded to the recording medium, and to provide an apparatus and an optical disc for realizing the method.

Brief Summary Text (29):

To achieve the object, the present invention provides a method for creating defect management information of an information recording medium comprising the steps of

detecting the presence of defective areas on an information recording medium on the basis of read-out errors of audio/video data reproduced from the information recording medium; and writing location information of the detected defective areas at a reserved area on the information recording medium, which can be situated adjacent to or separated from a general defect management information area of the information recording medium.

Brief Summary Text (30):

The method for creating defect management information according to the present invention further comprises the step of moving the location information of the detected defective sectors recorded in the reserved area into the general defect management information area, when one of pre-assigned operations such as erasing operation is requested.

Brief Summary Text (31):

An apparatus for creating defect management information of an information recording medium according to the present invention comprises a means for storing the location information of the detected defective areas separately according to whether or not the data to be reproduced is audio/video data or not; and a means for writing the two sets of location information of the detected defective areas into respective reserved areas on the information recording medium.

Brief Summary Text (32):

The apparatus for creating defect management information according to the present invention further comprises a means for obtaining addresses of the area in which data to be erased is recorded; a means for reviewing the storing means keeping the location information, or addresses of audio/video data's defective areas and determining whether or not there is any defective area, address of which is matched with the obtained addresses; and a means for moving the matched addresses between the areas for defect information.

Brief Summary Text (34):

According to the present invention, while reproducing data from the information recording medium, it is checked whether or not there are errors in the read-out of the data being reproduced. In case where read-out errors are detected during reproduction of audio/video data, location information of the corresponding defective areas is stored in a reserved area on the optical recording medium without sector replacement or stored in a portion of the storing means temporarily. The reserved area for the location information may be located close to or separated from the reserved area for general defect management information.

Brief Summary Text (35):

After that, if erasing of data on the information recording medium is requested, the address obtaining means obtains address information of the area in which the data to be erased is recorded. Next, the location information, or addresses of defective areas which are temporarily stored in the storing means are read out and are then compared with the obtained addresses to determine if there are matched addresses. The general defect management information is renewed to include the matched addresses by the moving means.

Drawing Description Text (10):

FIG. 7 is a flowchart showing the reproduction process of audio/video (A/V) data from the optical disc according to the method of creating defect management information of the present invention;

Detailed Description Text (32):

As shown in FIG. 10, a reserved location on the optical disc for the T-PDL can be arranged such that it lies in the data area, separated from the PDL and SDL, or in DMA of the lead-in-area together with the PDL and SDL. The former arrangement has an advantage of preserving the existing defect management information area for the PDL and SDL. In this arrangement, it is preferred that the space for the T-PDL is reserved at a location before or behind the area for storing a program menu information, which is accessed repeatedly in writing or reproduction operation. In the latter arrangement, the order in which three defect lists lies in the DMA can be changed.

CLAIMS:

1. A recording medium comprising: a data area including a good data block and a defective data block; a defect management area including an information for identifying at least a pre-specified defective data block; and a replacement area for replacing the defective data block, wherein the replacement area is used for replacing a defective data block based on a type of data in the data block, such that if the type of the data is non-real time data then the defective data block is replaced with a data block in the replacement area, and if the type of the data is real time data then the defective data block is not replaced, at least in a reading mode.

3. The recording medium of claim 1, wherein the information of the defect management area is updated when a new defective data block is found in reading mode.

5. A recording medium, comprising: a data area including a good data block or a defective data block; a defect management area including an information for identifying at least the defective data block; and a replacement area including an replacement block for the defective data block, wherein the defect management area also includes an information signifying whether or not a replacement of the defective data block into the replacement area is made.

7. The recording medium of claim 5 wherein the information of the defect management area is updated when a new defective data block is found in reading mode.

8. The recording medium of claim 5, wherein the signifying information is set based on a type of data written or read from the recording medium, wherein the information signifies that the defective data block is not replaced by a data block in the replacement area, if the data is real-time data, and wherein the information signifies that the defective data block is replaced by a data block in the replacement area, if the data is non-real-time data.

9. A method for creating and writing defect management information of an information recording medium, comprising the steps of: detecting the presence of a defective area in the information recording medium; determining whether to replace data in the detected defective area into a replacement area; and creating and writing information signifying whether or not a replacement of the detected defective area is performed.

11. An apparatus for creating and writing defect management information of an information recording medium, comprising: means for detecting the presence of a defective area in the information recording medium; means for determining whether to move data in the detected defective area into a replacement area and creating and writing information signifying whether or not a replacement of the detected defective area is made.

18. A method for creating and writing defect management information of an information recording medium, comprising the steps of: detecting the presence of a defective area in the information recording medium; determining whether to move data in the detected defective area into a replacement area for real time data; and creating and writing an information signifying whether or not a replacement of the detected defective area is made.

19. A method for creating and writing defect management information of an information recording medium, comprising the steps of: detecting the presence of a defective area in the information recording medium; determining whether to move data in the detected defective area into a replacement area; detecting type of data stored in the defective area; moving the data in the detected defective area into the replacement area if the data is non-real-time data; and recording information signifying whether or not a replacement of the detected defective area is made.

25. A method for recording defect management information for an information recording medium, the method comprising: detecting type of data and presence of a defective area in an information recording medium; preventing the data in the detected defective area from being stored in a replacement area, if the data is real-time-data; storing the data in the replacement area, if the data is non-real-time data; and recording an information signifying whether or not the data in the detected defective area is stored in the

replacement area based on a type of data.

26. A recording medium comprising: a data area comprising a good data block and a defective data block; a defect management area comprising information for identifying at least a pre-specified defective data block; a replacement area for replacing the defective data block, wherein the replacement area is used for replacing a defective data block found in a reading mode, if type of data read is non-real-time data; and information for indicating whether or not the defective data block is replaced with a block of the replacement area, wherein the information indicates that the defective block is replaced with a block of replacement area, if the type of data block is non real-time data, and wherein the information indicates that the defective block is not replaced into a block of replacement area, if the type of data block is real-time data.

27. A method for creating and writing defect management information of an information recording medium, the method comprising: detecting the presence of a defective area in an information recording medium; controlling data in the detected defective area such that the data is not moved into a replacement area for real time data; and writing information signifying that a replacement for the data in the defective area is not made.

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